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Jet-fluid interaction in EPOS3-HQ framework

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A consistent modelling of back reaction of the hydrodynamic medium on the jet evolution is important for understanding the substructure of jets produced in heavy ion collisions. The majority of existing models implement only one-way jet-hydro interaction by coupling jets to a fixed hydrodynamic expansion and not including the energy deposition in the medium itself.

In this talk, we show the results for PbPb collisions at 2.76 TeV LHC energy from a parton shower integrated with hydrodynamic evolution within the EPOS3-HQ model. The initial hard (jet) partons are produced along with soft partons in the initial state EPOS approach. The soft partons, represented by strings, melt into a thermalized medium which is described with a 3 dimensional event-by-event viscous hydrodynamic approach. The jet partons then propagate in the hydrodynamically expanding medium. The total jet energy gets progressively "degraded"as the partons reaching a certain lower cut off are "melted"into the hydrodynamic medium via the source terms. The full evolution proceeds in a concurrent mode, without separate hydrodynamic and jet parts.

We demonstrate both the medium modification effects on the jet evolution and the perturbations in the hydrodynamic expansion from the energy lost by the jets. The perturbations translate into irregularities in the transverse momentum spectra of hadrons produced out of the fluid. We show how this affects the jet shape observable. Last but not least, we show how the hadronization and jet reconstruction procedures modify the manifested jet shape.

Collaboration name

Track

Hydrodynamics, chirality and vorticity

Primary authors: KARPENKO, Iurii (SUBATECH Nantes); Prof. AICHELIN, Joerg (Subatech/CNRS); Prof. GOSSIAUX, Pol (Subatech); ROHRMOSER, Martin (Jan Kochanowski University Kielce); Prof. WERNER, Klaus (SUBATECH)

Presenter: KARPENKO, Iurii (SUBATECH Nantes)

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